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ABSTRACT

In recent years a number of models of depression have been proposed. Many of them have incorporated cognitive constructs to explain vulnerability, initiation, maintenance, and recovery from depression. In light of the wealth of experimental and clinical knowledge about depression, these models can be seen as having a limited focus and scope. Current models of depression have little implication for discriminating depression from other emotional states or disorders and they do not incorporate a developmental perspective. Finally, although some of the most recent models have begun to borrow theoretical positions from the cognitive psychology memory literature, they have done so without consideration for the nuances of different theories in memory and their implications for dealing with the phenomena of depression. Building on previous theoretical work, this research attempts to develop a model using constructs from the memory and developmental literatures that will be useful in describing depression and in differentiating depression from other affective states. The intent is to incorporate relevant constructs that will produce a dynamic model to account for the various processes of change in the course of depression. The plan is to incorporate developmental constructs to deal with the origins of vulnerability factors and with the occurrence of depression among children. (ABL)

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A MEMORY MODEL OF DEPRESSION: AN ANALYSIS OF COGNITION, DEVELOPMENT AND EMOTION

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Our purpose in this paper is to outline the initial components that would need to be included in a comprehensive theory of depression derived from current models of memory. This should be considered a working paper reporting on efforts to date in our thinking about this problem with the eventual goal of integrating these components into a cognitive model of depression with memory at the center of the cognitive system.

In recent years a number of models of depression have been proposed. Many of them have encorporated cognitive constructs to explain vulnerability, initiation, maintenance and recovery from depression. In light of the wealth of experimental and clinical knowledge about depression that exists today, these models can be seen as having a limited focus and scope. Current models of depression have, for example, little implication for discriminating depression from other emotional states or disorders. In addition, they do not encorporate a developmental perspective. Finally, where some of the most recent models have begun to borrow theoretical positions from the cognitive psychology memory literature, they have done so without consideration for the nuances of different theories in memory and their implications for dealing with the phenomena of depression.

Building on the existing theoretical work of John Teasdale, Gordon Bower, Henry Ellis, Rick Ingram, Nicholas Kuiper and others, our aim is to develop a model using constructs from the memory and developmental literatures that will be useful in describing depression and in differentiating depression from other affective states. Our intent is to encorporate relevant constructs that will produce a dynamic model that will account for the various processes of change in the course of depression. In addition we plan to encorporate developmental constructs to deal with the origins of vulnerability factors and with the occurence of depression among children.

MEMORY

Modern theory and research on memory has developed a number of useful constructs and ideas. Three components of memory structur have been differeniated - the sensory register, short term store (STS), and long term store (LTS). The sensory register briefly holds raw sensory input in primary form prior to processing, abstraction and storage. STS is considered to be

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the working memory where information is processed, transformed and used. STS has demonstrable capacity limits, and capacity is taken up both by the extent of infomation being processed and by the complexity of the processing procedure or "program". LTS is the site of all information stored in memory that is potentially available for retrieval and use in STS. It is considered essentially limitless in size, highly organized, and subject to forgetting due to retrieval problems.

Memory theorists (e.g. Tulving, 1983; 1986) distinguish between episodic and semantic memory in LTS. Semantic memory refers to factual memory content, or general knowledge about the world. (e.g. Who was the first president of the United States? How many S's are in Mississippi?) Episodic memory consists of personal episodes, generally organized around perceptual components. (e.g. Where were you and how did you feel when you heard of the space shuttle crash? What was your first kiss like?) Semantic memory is "cool" memory. It does not have much affect attached to it. Episodic memory is "hot" memory. These are memories for specific events and experiences. They are affect laden and often have features which place them in time and space. While most of the interest among cognitive psychologists cinters around the organization of LTS semantic memory, our interests focus on LTS episodic memory and how it interacts with LTS semantic both in the adult and in the developing child.

Current memory theorists think of memory as process as well as structure. Memory processes are considered to vary along a continuum based on the amount of attention or effort required for their implementation. Control or mnemonic processes, on the one hand, require attention for initiation and use. Automatic or involuntary processes, on the other hand, make minimal attentional demands. Automatic processes include involuntary pattern recognition, inferencing, generalization and retrieval. Some mnemonic processes are rehearsal, effortful retrieval and recoding. For our purposes mnemonic processes can be conceptualized as occurring in STS, whereas more automatic ones can be seen as occurring in LTS. Both types of memory processes play a role in our analysis of depression.

Domains of knowledge consist of structures of information organized in systematic ways. In episodic memory the organization in considered primarily temporal and perceptual, whereas, in semantic memory it is thought to be conceptual. Units of storage proposed by different theories include nodes, propositions and schemas. We consider a schematic model, combined with a developmental perspective, as being most useful for dealing with clinical phenomena. Semantic memory schemas have an organization and an internal consistency but similar and related structures may co-exist in episodic memory that are less organized and not consistent. Some semantic memory schemas may be "encapsulated" from episodic memory, that is, they are primarily temporally organized and emotional, with little structural connection to other schemas.

A particularly important set of memories and information in storage concerns oneself. Many personality theories postulate a self-structure made up of memories, facts, beliefs, feelings and attitudes about oneself. This information is stored and is used

to interpret new experience. We consider these self schemas within semantic memory, but often encapsulated and relying heavily on episodic information. Personality theorists have stressed the importance of affective, evaluative experience in forming ones conceptions of oneself. Information about oneself may have a degree of organization and consistency in the way it is structured, but it is also true that representations of incompatible experiences, feeling, beliefs, etc. may co-exist.

A basic premise of our conceptualization is that affect is an important quality in the encoding and retrieval of experience and is involved in both mnemonic processing of STS and more automatic processing of LTS. Memories are stored with their affective quality as a salient feature. One's current emotional state acts as a contextual cue that facilitates access to memories that feature a similar affective quality. When we are sad, anxious, angry, disgusted or elated, we are more likely to recall experiences that occurred when we were in that same affective state. Some memories are more affect laden than others. Memories may vary on a continuum of the degree to which emotion is a salient feature. Access will be facilitated by current emotional state as a function of the degree of affective quality of types of memory. Current affective state will therefore have an inportant role in determining how new information is interpreted. Affectively consistent interpretive hypotheses will be generated and tested against affectively consistent standards. Different and inconsistent hypotheses and standards may be accessed in different emotional states. Conclusions drawn from processing of this type leads to beliefs about ones value, power or potency, and ability to act effectively in specific situations.

COURSE OF DEPRESSION

Vulnerability to depression is established when an individual develops encapsulated negative self-schemas as part of the overall structure of information about oneself. These negative schemas may exist in relative independence from coexisting more positive schemas. Thus they may not be apparent in the daily functioning of the depression vulnerable person who is ordinarily accessing and using more positive schemas. Experiences involving negative evaluation of oneself and ones abilities access negative self-schemas and are encorporated into these schemas. Negative experiences in childhood may be particularly important in establishing this cycle. Depending on the child's stage of development, negative experience may be generalized more broadly and may be more fundamentally influential in forming self-schema.

Precipitation of an episode of depression occurs when events are interpreted as negative and personally relevant. Sad affect then directs processing of new episodic information by accessing similarly toned memories, hypotheses and standards in semantic memory. There may be evolutionary value in this process in that it aids in the recall of information about similar events in the past and might have served the function of accessing appropriate actions to take in situations of loss or deprivation. In modern

times accessed negative memories may be less likely to be associated with solutions to problems and more likely to be associated with ideas of hopelessness and helplessness.

In the ordinary case of the normal (not depression vulnerable) person, subsequent experiences redirect access away from limited negative self-schemas and toward more extensive and interrelated positive self-schemas. Such depressions are time-limited as with normal grief reactions. However, in the depression prone person, subsequent experiences may be interpreted in a continuing negative manner because of the accessing of extensive, generalized and more integrated negative self-schemas. Thus the depression maintains itself and may even strengthen the depressive schemas. In some individuals, negative schemas may predominate and they may exhibit depressive thinking and behavior in most of their lives. This is the dysthymic or chronically depressed person.

Teasdale (1983) has suggested that such a model leads to two general strategies for therapy. First, the depressed person could be encouraged to engage in positive activities that were associated with positive memories and positive feeling about oneself. This is the strategy of some of the behaviorally oriented therapies for depression. Secondly, the depressed person could be helped to recognize the bias in their thought processing and to consciously make the effort to access alternative memories, hypotheses and standards. This is the strategy of the cognitive therapies for depression. Psychopharmacological intervention might change the current affective state and thus afford access to more positive and realistic schemas.

MOOD CONGRUENT RECALL

This conceptualization is useful for thinking about a number of phenomena that have been investigated in the research literature on cognitive aspects of depression, each dealing with some aspect of memory structure and/or processing. One important area of recent research has been referred to as mood congruent memory. If one is in a sad mood, it will be easier to recall sad events from last week (Bower, 1981) or from childhood (Teasdale and Fogarty, 1979). If one is asked to recall a happy childhood event it will take longer when in a current sad mood.

The related effect of state related learning has yielded less consistent results, but the findings are nonetheless consistent with the idea that emotion is a factor in the storage and retrieval of information, and plays a central role in mnemonic processing.

SELF-REFERENT ENCODING

A second area of memory research in depression has investigatied self-referent encoding. The idea of these studies is that an organized set of information about oneself, i.e. a self structure, can act as a heuristic for organizing new information for encoding and storage. In what is sometimes

referred to as a depth of processing paradigm, subjects are asked to view a series of words and perform one of several different tasks with the word, e. g. "Tell me whether the word is written in small or large letters"; "Tell me if the word means the same as X"; or "Tell me which words apply to you." Recall is better for words which you processed as self-referent, i.e. told whether they applied to you. It is assumed that in this situation the information is more "deeply" processed because the self structure is a powerful organizer of information.

The relevance of this idea to depression is that a depressed person is presumed to develop a self-structure predominantly made up of negative information. Thus, it is hypothesized that depressed persons will have enhanced recall of negative self-referent information and normals enhanced recall of positive self-referent information. This experimental paradigm has been replicated a number of times (e.g. Derry and Kuiper, 1981). The clinical relevance of this effect is that depressed persons are more aware of and selectively recall negative rather than positive feedback from others. They remember the criticism but not the praise, (e.g. Gotlib, 1983).

The problem is that the results do not follow from the simple hypothesis. If a depressed person has an organized self-structure, it may predominantly contain negative information but it will still contain some positive information. Depressed subjects still indicate that <u>some</u> positive adjectives apply to them. If these positive adjectives are just as consistent with the self-structure they should not be harder to recall. The results can be explained by proposing that information is better recalled if it is self-referent <u>and</u> is consistent with curent mood state. Again, emotional quality is the connection that facilitates the recall. Analysis of mnemonic processing in the context of the structure of episodic and semantic memory may also be useful in further understanding this process.

SELF-EVALUATION AND SOCIAL JUDGMENT

Self-evaluation and social judgment involve the way in which depressed persons make automatic inferences about their behavior, the behavior of others, and events in their experience. Depressed persons make negative evaluations of their own performance. There are many published examples where depressed persons rate themselves as having performed more poorly than nondepressed persons on a variety of tasks despite actual equivalent performance.

Negative self-evaluation, however, does not necessarily mean negative evaluation of others. For example, in one study, (Shrauger & Terbovic, 1976) subjects watched a videotape of either their own performance on a task or a tape of a confederate who exactly duplicated their performance. Depressed persons rated the other person's performance more favorably than their own. Nondepressed persons rated them equally.

Depressed persons expect to do more poorly in the future although depending on the task, they may be just as accurate in predicting actual performance, i.e. "I'll get 90% right but that isn't really very good." In some instances depressed persons are

also negative in social judgments about the world. For example, depressed people rate human problems as more frequent, harder to cope with, and causing more distress (e.g. Hammen, 1978; Kuiper & MacDonald, 1983). These judgments would seem to imply a type of self-reference in that the person would be required to rely on their personal experiences in making these judgments.

Inferences about causality in personal experience have been the focus of a large body of depression research. The revised learned helplessness model of depression (Abramson, Seligman & Teasdale, 1978), postulates that helpless attributions of causality about negative life events are one cause of depression. They argue that a depressive attributional style is a contributory cause. The evidence is quite clear, however, that attributions also become helpless when a person becomes depressed. From the perspective we are proposing, attributions are simply another form of depressive inference and another example of current mood influencing retrieval of similarly toned information. It is not controllability that is the critical factor in depression. It is the negative affect associated with helpless attributions.

What is the process that people go through when they make an evaluation of the quality of their performance, or some other inferential judgment about their behavior? In various ways they compare the facts at hand to similar experiences from semantic memory. If current mood biases memory toward negative schemas, then evaluative judgments, especially those that refer to oneself, are negatively biased. Negative self-evaluations may "feel" correct because they are consistent with current mood.

In our memory model of depression, the depressed person's information processing is emotionally biased. It is not distorted in the sense of altering accurate perception. Bias occurs under conditions of uncertainty where there is room for subjective judgment and inference. For the depressed person, bias in processing consistently occurs in the negative valence dimension of emotion. For other people, biases also occur, some of which relate to current mood. Psychologists have studied the ways in which normal people are systematically biased in their inferences, (cf. Tversky & Kahneman, 1974). For example, normals are biased in their judgments of causality by the outcome of a performance. That is, if outcome is positive the person concludes, "I must be responsible," but if the outcome is negative, "It was bad luck." Emotional state is a source of bias in judgment.

This memory model of depression is in many ways consistent with the first author's earlier concerns in the self-control or self-management model of depression (Rehm, 1977). When negative schemas are accessed routinely they influence ongoing processing of information and direction of behavior and this is self-management. Negative self-schemas influence attention to and selection of relevant information from the environment. The depressed person is vigilant in seeking evidence of failure. Negative information is most salient and is selectively attended to. Selection of hypotheses and standards for judging ones behavior by the depressed person produces negative self-evaluation and negative attributions of responsibility. Estimates of future success or of efficacy are negatively biased

and the result is little "motivation" to initiate or persist in efforts aimed at long term goals. In the memory model of depression, the memory system with its processes and structures are seen as the center of the cognitive system and the basis for understanding both normal and psychopathological self-control and emotional states.

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